

# Community Self-Reliance During Bushfires: The Case For Staying At Home

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## Abstract

The Australasian Fire Authorities Council (AFAC) has an agreed position in relation to community safety and evacuation during bushfires. Essentially this position advocates that where people have adequately prepared themselves and their houses and properties, they should remain with their homes during bushfires, rather than evacuate.

Conclusive research conducted following major bushfires in Australia underpins this position. Most buildings lost in bushfires are the result of initially small fires started by sparks and embers. Buildings will generally survive the initial passage of a fire front providing adequate preparations have been made and providing people remain to extinguish small fires started in and around them. Exposure to dangerous levels of radiant heat created by bushfires is the greatest risk to peoples' safety. Consequently people who are prepared and take shelter in their homes are well protected from radiant heat. Last minute evacuations from bushfires are inherently dangerous and can create much greater risks than remaining in the fire area.

Most Australian fire authorities, including Tasmania Fire Service no longer support large-scale evacuation of people from areas threatened by bushfires. The approach is to empower people and communities to take increased responsibility for their own safety. This is a departure from the conventional paternalistic approach of emergency services in dealing with large scale emergencies. It in many ways is a move back to the pre-emergency service era when communities were left to take care of their own safety. Such empowerment creates many advantages but also brings with it many challenges.

Bushfires are a natural hazard which can be foreseen, prevented and combated to a greater degree than hazards such as severe storms, floods, earthquakes and vulcanism. Australian fire authorities have the challenge of reducing the negative impacts of bushfires on a community which increasingly wants to live close to the bush complete with all its natural attributes including fire hazards.

In this paper, the causes of building damage and human losses during bushfires are briefly described as background to the position adopted by the Australasian Fire Authorities Council (AFAC) titled *Community Safety and Evacuation during Bushfires*.

## Lessons learnt from past bushfires

In the wake of the many serious bushfires which have occurred in the past 40 years or so, researchers in the CSIRO, universities and fire services have investigated how and why houses are ignited and subsequently destroyed in bushfires. These investigations, conducted

immediately following each major fire event, studied the circumstances surrounding the loss of houses in relation to type of construction, building materials, siting, mechanisms of ignition and destruction and effectiveness of firefighting intervention (Leonard and McArthur 1999, see also Leonard this conference).

The research conclusively found that the dominant mechanism of ignition of houses is airborne embers entering buildings or landing on vulnerable parts of buildings. In a minority of cases the ignition source is direct flame contact and radiant heat usually from vegetation burning in close proximity to the building.

Damage by wind accompanying the fire is also common. This was a major factor in the damage and loss of many houses in the Canberra fires of January 2003. Wind has been found to cause direct damage to buildings by, for example, removing roof cladding or blowing in windows, and indirectly, by blowing tree branches or other items into windows causing them to break. In either case, wind can breach the integrity of buildings giving access to burning embers.

Accounts of spontaneously exploding houses have been discounted. Strong evidence suggests that ignition usually occurs through wind borne embers starting a small fire or fires on or in a combustible part of the building. These small fires may grow relatively slowly or unnoticed at first. Once the inside of the building is alight the fire may continue to burn slowly, pre-heating the inside and contents until a window breaks, or the fire breaks through to the outside, venting the fire and resulting in very rapid or almost explosive combustion. Frequently, the ambient weather conditions speed the rate of destruction. During the time between the spot fire ignition and the rapid destruction phase, there is usually opportunity for successful intervention by vigilant people with simple firefighting tools such as a wet mop and bucket of water.

The majority of houses lost, almost regardless of their construction, are unoccupied at the time of the fire passage. Many houses burn down up to 3 hours after the fire front passes. Of the houses that survive, the majority are protected through the actions of people, either the occupants, neighbours or fire brigades. These people are able to take action, often just by extinguishing the very small fires started by airborne embers (Wilson and Ferguson 1984).

The flammability of construction materials does have an influence, but this is effectively reduced because in Australia highly flammable products such as timber shakes and shingles and bituminised roofing are not usually permitted to be used for residential purposes. As would be expected, masonry provides the best protection.

### **Bushfire Deaths**

Research has revealed radiant heat to be the biggest cause of death. Caught in the open, people are extremely susceptible to radiant heat and are rapidly overcome by heat stress. Solid surfaces provide the best protection from radiant heat and one of the best is sheltering in buildings. Houses do not explode and even during the passage of the main fire front, unprotected houses will provide a safe haven during its passage and the period of highest radiant heat.

Many people who have perished in Australia during bushfires did so trying to escape. Frequently they were caught on roads blocked by fallen trees or powerlines. In other cases they crashed because of smoke or panic or both. In his investigation of the 1967 Tasmanian bushfires McArthur commented "In the case of over 50 percent of the people who died

escaping from their house, the house from which they fled did not catch fire. Thus it can be said that if they had stayed by their house they should have survived.” (McArthur 1967)

Evacuation is frequently left until the last possible moment and then it can be too late. People commonly try to take with them all that is precious, taking too long to pack it into their vehicle, or suddenly having to find pets before leaving (Krusel and Petris 1992).

### **The AFAC Position on Community Safety and Evacuation During Bushfires**

Despite the research, until fairly recently the popular view held widely by both emergency services and the general community was that evacuation was the safest and most favoured option. There were plenty of myths about incredible fire behaviour which helped to reinforce the view that staying in a bushfire area was an extremely risky thing to do. Stories of houses spontaneously exploding and fireballs leaping from hill to hill still persist despite the lack of empirical evidence. Members of AFAC believed it was timely to examine this view and to develop a position which met community needs and expectations.

Consequently about seven years ago AFAC developed its position in relation to bushfire safety particularly including evacuation issues. Prior to this there was an inconsistent approach across Australia. In many places in the absence of policy or doctrine, people were frequently advised to evacuate, sometimes forcibly. Essentially this was seen to be the safe option, particularly by police who in most States have the authority and responsibility to evacuate people at risk. There were also places where fire authorities had sufficient influence and conviction to promote the strategy of encouraging residents to stay and defend their homes in keeping with the research previously discussed.

In October 2001 all Australian Police Commissioners except Queensland gave their organisations’ support to the AFAC position, however this has not been apparent in the fire seasons since 2001. In some States, police may exercise the evacuation option at times when it is not appropriate and also contrary to the AFAC position. Regrettably those evacuations are often widely publicised by the national media, making it very difficult to gain acceptance of the AFAC position despite widespread fire service support.

Fundamentally the AFAC Position proposes that communities at risk from bushfires be allowed and encouraged to take responsibility for their own safety. Essentially the rationale is simple - *houses protect people and people protect houses*. The AFAC position advocates that where people have adequately prepared themselves and their houses and properties, they should remain with their homes during bushfires. People who are not physically or mentally prepared to undertake firefighting activities should move to a safe area well ahead of a fire’s arrival. This group of people usually includes the very young, older people who may no longer be physically agile and sick or people with restricted mobility. People who believe they are not capable of enduring the trauma associated with a bushfire situation or people who just do not want to be there, for whatever reason, should relocate to a safe place well before a fire is expected. Those people who have not adequately prepared should also leave and relocate early.

Despite the national AFAC position, each State and Territory has its own interpretation and is progressing implementation at an appropriate pace. Clearly the rate of community acceptance and adoption of preparatory measures will limit the degree of implementation of the position.

## **Bushfire Preparatory Strategies**

Adequate preparation is essential for bushfire survival. People living in an urban interface area (and anywhere else where buildings are located beside or within the bush) are advised to undertake fire protection measures to reduce their vulnerability to bushfires.

The single most important fire protection measure influencing the safety of people and their property is the creation of a *defendable space* around houses and other buildings. Defendable space is an area surrounding a building that is free of, (or has significantly reduced) continuous combustible vegetation or other fuels. Having a defendable space essentially provides a clear area which prevents a moving fire spreading directly to the building and limiting the radiant heat load in the vicinity of the building. It can provide a relatively safe area from which the advancing fire can be controlled and within which firefighters and residents can safely control ember started fires on and around the building.

House design and construction materials need to be taken into account. Spaces and gaps which could allow wind-driven embers to lodge should be minimised, as should combustible horizontal or sloping surfaces such as timber decks and verandahs. Roof guttering (spouting) should be maintained in a clean condition. For those situations surrounded by tall eucalypts that continuously shed twig, bark and leaf debris, this is an ongoing regular task.

An adequate water supply and firefighting tools such as a pump and hose are normally recommended for rural areas. In the suburbs on the fringe they are probably not essential. Simple fire fighting tools such as buckets of water, wet mops and knapsack pump garden sprayers are usually available and can be very effective.

Australian fire services recommend attention is paid to all the potential ways of improving the safety performance of buildings and their surrounds. This multi-faceted approach will optimise the resistance of a building to bushfires and provide as a consequence, a safe haven for its residents.

### **Stay or Go?**

People who have not undertaken adequate preparation are advised not to stay.

Where a house does not have sufficient defendable space and access to water supplies, the chances of saving it are greatly reduced and the danger for remaining occupants is increased. The advice therefore, for those people is to leave, but do so early.

Quite commonly in the Australian environment, because of the steep terrain and the rapid fire spread through spotting (fires started ahead of the fire by burning embers), there can be little warning time. Escape routes become blocked by smoke, fire, falling trees or power lines. In such cases when the dangers posed by escaping exceed those of remaining, clearly the best option is to stay.

The road systems in urban interface and rural areas are typically not designed to handle high traffic flows and speeds, particularly when people are going in the opposite direction to responding fire appliances. The logistics of moving a lot of people quickly and safely make large scale evacuations very difficult. Television images of people with belongings packed, caught on blocked highways fleeing from danger are not uncommon. Even organised evacuations are not always orderly. Inexperienced and frightened people faced with evacuation from a terrifying fire may behave irrationally. Being told to go by those in

authority – police or fire officers, is the final signal that all is far from ok. Seeing and hearing people in authority anxiously urging people to leave sends a very strong message that disaster is imminent.

What responsibility or duty of care do those who order evacuations have to ensure that the evacuees are safe during the transit process as well as being safe in the chosen refuge?

While fleeing from danger is a normal human instinct and not being there is the safest option, as discussed above there are many reasons why this is not a practical or safe option.

Fire events are very dynamic and place specific. The orientation of the interface and the road network with respect to a fire front or series of fire fronts, as well as smoke effects make it very difficult to realistically simulate or predict bushfires. The inclusion of community factors such as demographics, community expectations and identification with the bush, and previous bushfire experience increase the difficulty of pre-incident planning.

The Position implicitly accepts that there will be occasions, hopefully very rare, where a person will be killed by staying with their home. In such cases, where a person's life is immediately at risk by them being in a particular location (in the opinion of the on-scene fire or police officer), they may be advised to evacuate. Should the advice be not heeded then in most States, legislation enables evacuation to be ordered (with force if necessary).

Special reference is made in the Position to issues in relation to access and egress. Roads often need to be closed during the passage of the fire and for some time afterwards. People who choose to leave need to be aware that they may be prevented from returning by closed roads. Those wishing to return to their property may similarly be prevented. There is a clear and reasonable duty of care by both the fire and police services to allow residents access to their property, but without compromising safety by allowing traffic to move along roads affected by smoke or fire.

Evacuation as a safety strategy has in the past been supported and employed in the belief that people are prone to panic and irrational behaviour when faced with an unfamiliar and threatening emergency situation. Evacuation from a bushfire can itself result in some people being exposed to greater safety risks at times, as well as often resulting in much greater property losses. In the absence of residents, property has to be defended by often limited firefighting resources. If people are well informed, prepared and empowered, they are capable of taking appropriate actions to protect themselves and their property without the need for evacuation or close supervision and direction by emergency services. Such active community involvement will free up firefighting and emergency resources, allowing their more effective deployment.

Empowering people and giving them greater responsibility for their own safety is not a new philosophy. In Australia emergency services only began taking a paternalistic approach for people's welfare during emergencies over about the last 50 years as community expectation for governments to provide services and protect citizens increased. Prior to then people accepted that they were expected to take care of themselves. This was particularly so in rural areas where at times of crisis, communities took control of their own destiny. There was a greater sense of community and communities were more self reliant. Fighting bushfires was a community responsibility. Paradoxically as technological and financial capacity improved since the Second World War, emergency managers unwittingly were alienating rather than reinforcing community responsibility for natural hazard and emergency management.

The father of bushfire research in Australia, the late Alan McArthur, over 30 years ago in his report on the Tasmanian Black Tuesday fire disaster of February 7 1967 said: "One feature of housing losses in these fringe developments was in fact that groups of houses tended to survive in some localities, notably along Waterworks Road. When these situations were investigated, it was found that in all cases a group of people under strong leadership had stayed and fought the fires with garden hoses, wet bags and any other rough and ready means available. This proved that houses could be saved and people survive in an environment of fire which few other people in the world have ever experienced."

### **Future challenges**

Educating people in at risk communities is a significant challenge. Empowerment must extend beyond people knowing what to expect and how to react when threatened by bushfire. The stay and defend strategy is only effective if it is preceded by adequate preparation. Preparation isn't necessarily just creating a defensible space, but also mental preparation - knowing what to expect. Fire services need to be realistic in what they communicate to people in fire situations. The success of the strategy relies heavily on the people in affected communities making appropriate decisions. For that they need to have access to timely and accurate information about the fire situation.

The emergency managers in those communities also need to conform to the policy. Police and others need to accept that people will want to stay with their homes and need to be supported in place. They too need timely and accurate information.

Whilst that seems reasonable, gathering timely and accurate information and communicating it to the people needing it, presents a considerable challenge. Whilst most fire fighters appreciate the importance of accurate and up-to-date information few have seen a need to provide it to the people at risk. The empowerment and consequent effectiveness of residents is dependent on them too having good information.

### **Can it work? – The Tasmanian experience**

Tasmania Fire Service (TFS) and Tasmania Police developed a protocol in 1998 based around the AFAC position that articulated how people threatened by bushfire in Tasmania would be managed particularly in relation to evacuation (Gledhill 1998). Soon after it was agreed, a major fire occurred on the fringe of Hobart. During this fire the protocol between Police and Fire was put into operation. There was no mass evacuation yet in a 24 hour period approximately some 1,000 houses were directly threatened by the fire. Despite the extreme conditions and severe fire behaviour only 7 houses were lost, 6 of those were unoccupied. Quite clearly the strategy worked and the community rallied behind the Fire Service once it realised that it worked.

Once again in the 2002/2003 fire season TFS employed the same practices in relation to evacuation - there were no mass evacuations at any of the major fires that occurred during the summer. There was an overwhelming acceptance by the local media and the community, particularly by those people who were affected by the fires. They showed their support very clearly to being involved in a partnership arrangement with the Fire Service to protect their own properties.

Additionally, when it became clear in several areas that some communities would be under significant threat, TFS used volunteers to doorknock and distribute a simple one page brochure to thousands of householders identified as being at immediate risk. The brochure



advised that there was a significant imminent bushfire threat and recommended strategies to reduce that threat.

In the 2003 fires TFS attempted new strategies to gather real time and accurate information. This intelligence was collected by trained observers both on the ground and in helicopters for the incident management teams controlling the incidents and also for the wider community particularly the at-risk residents.

Having trained and dedicated observers both in the air and on the ground providing accurate assessments of the fire behaviour and fire location and other issues appears to be effective. That information is transmitted to both incident management teams and directly to a central location at headquarters where the information is processed into a form that people would understand.

The TFS website was once again used this year to disseminate fire information and maintain a running log of what was happening on different fires around the State. This information was simultaneously accessible by the media, by our own staff and by the community at large. The feedback results were overwhelmingly encouraging. The challenge for the Fire Service is to make sure the whole system works. Breaking it down into its components there needs to be

- trained people to gather the information and that may at times need to be both on the ground and in the air,
- the information needs to be quickly transmitted back to a central location where a very experienced person can assimilate and interpret the observations,
- translate the information into a written form that is readily understandable by lay people and
- input onto the website.

The power of the internet to be able to simultaneously provide information to many people has provided a quantum leap in emergency management. It increases the speed, accessibility, accuracy and consistency of vital information therefore enabling improved decision making by those involved in firefighting and those in support. The paternalistic approach of fire services, TFS included, in the past is now giving way to a new paradigm. There is a steadily increasing acceptance of the need for a partnership between those at risk from bushfires and their fire service. Community safety from bushfires is more effective if the responsibility is shared. No longer are the people in the community expecting the fire service alone to be their saviours, but they are now recognising that they themselves can do much in partnership to assist.

The importance of the media in this strategy can not be overstated. The media remain central to the success of communication between the fire service and the residents in the at risk communities. Developing a close relationship where the media understand the role they play in shaping the outcome of bushfire scenarios is vital. The media don't just need access to accurate and timely information like the community but they also need access to firegrounds to be able to report precisely what is happening. Just providing carefully written media statements is not conducive to creating a partnership arrangement with media. Relationships with local media in particular need to be continuously maintained, not just prior to the onset of the fire season.

Following the 2003 Broadmarsh fire TFS surveyed residents effected by and in the vicinity of the fire. The survey confirmed support for their involvement in their own protection. There was a sense of ownership, pride and achievement through their involvement. The survey results indicated most people faced with the same situation would be prepared to undertake it

again. Anecdotal evidence suggests most people who stay and protect their properties experience high levels of fear and this should not be overlooked or downplayed. However those who support evacuation need to accept evacuation may well be more traumatic.

The shift in the paradigm to empower and involve people at risk in accepting greater responsibility for their own safety is not unique to Tasmania and similar strategies are now emerging in a number of other places around Australia. I believe that this new way of doing business will underpin future strategies for fire protection from bushfires.

## Conclusion

Bushfires in Australia are inevitable. The interface between people and the bush continues to grow as cities expand and people seek to live alongside and amongst it. The combination of climate and weather with flammable vegetation and people will continue to produce fires. Whilst people, directly and indirectly, are by far the greatest cause of bushfires in Australia, controlling people and their use or abuse of fire is not a realistic or practical solution - accidents and stupidity are somewhat inevitable. Climate and weather are not capable of manipulation and so bushfires will continue to occur. We must learn to live safely with them.

Empowering the communities at risk from bushfire to play an active part in their own safety and in the protection of their assets in partnership with their fire services is a viable long term strategy to enable safe co-existence with fire as a natural element of our environment.

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